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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/974,581	10/09/2001	Chong-Yung Chi	JCLA7934	8294

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EXAMINER

FAN, CHIEH M

ART UNIT PAPER NUMBER

2634

DATE MAILED: 12/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/974,581

Applicant(s)

CHI ET AL.

Examiner

Chieh M Fan

Art Unit

2634

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 October 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 October 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claims 1-9 are objected to because of the following informalities:

Regarding claim 1, it is suggested inserting --- using an equalizer --- after blind deconvolution” in line 1 so as to provide antecedent basis for the limitation “the equalizer” recited in line 4; and inserting --- inverse filter criteria --- before $J_{p,q}(v_l)$ in line

8. Furthermore, each of the variables such as \tilde{R} , \tilde{d} , p , q , α needs to be defined.

Regarding claim 3, $x[n]$ needs to be defined.

Regarding claim 5, it is suggested changing “blind deconvolution in a communication receiver” in line 1 to --- iterative blind deconvolution using an equalizer in a communications receiver of a multi-input multi-output (MIMO) system, so as to provide antecedent basis for the limitations “the equalizer” (line 4), “the current iteration” (line 5) and “the MIMO system” (line 10).

Regarding claim 6, each of the variables such as \tilde{R} , \tilde{d} , p , q , α needs to be defined.

Regarding claim 7, it is suggested adding --- wherein $e_l[n]$ is an equalizer output at the l th iteration --- at the end of line 3.

Regarding claim 8, it is suggested adding --- wherein $e_l[n]$ is an equalizer output at the l th iteration --- at the end of line 3.

Regarding claim 9, $x[n]$ needs to be defined.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 5-9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 5 recites the limitation "the value of the Inverse Filter Criteria (IFC)" in line

5. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

5. Claim 5 is rejected under 35 U.S.C. 102(a) as being clearly anticipated by Chi et al. (IEEE conference proceedings, "Blind Equalization using cumulant based MIMO inverse filter criteria for multiuser DS/CDMA systems in multipath"; different inventive entity). In particular, the claimed limitation is described in the left column of page 119.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1-4 and 6-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chi et al. (IEEE conference proceedings, "Blind Equalization using cumulant based MIMO inverse filter criteria for multiuser DS/CDMA systems in multipath") in view of Inouye et al. (IEEE paper, "Super-Exponential Algorithm for Multichannel Blind Deconvolution").

Regarding claims 1 and 6, Chi et al. teaches the claimed updating, determining and comparing steps (see S1 and S2 steps of Algorithm 1 described on the left column of page 119), except that the equalizer coefficients v_l is updated by a different equation.

However, Inouye et al. propose an iterative super-exponential algorithm (SEA) that updates the coefficients v_i by the claimed equation (the applicants admitted such teaching, see equation (4) of the present application). Inouye et al. further teach that SEA has the following advantages: (a) it converges iteratively to a desired solution regardless of initialization at a very fast rate; and (b) it does not need explicitly prewhitening operations (see left column of page 881). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to update the equalizer coefficients using the equation taught by Inouye et al., so as to achieve the advantages (a) and (b) described above.

Regarding claims 3 and 8, Chi et al. also teach a multistage successive cancellation (MSC) procedure, each stage comprising the obtaining, determining, estimating and updating steps as claimed (see the description under "Channel Estimation and Signal Cancellation" on page 119 and under "New Algorithm for Blind Equalization of DS/CDMA Systems" on page 120).

Regarding claims 2, 4, 7 and 9, Chi et al. also teach the claimed limitation (see the description under "Channel Estimation and Signal Cancellation" on page 119 and under "New Algorithm for Blind Equalization of DS/CDMA Systems" on page 120, particularly the step (V3)).

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Noonan et al. (U.S. Patent No. 6,049,574).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chieh M Fan whose telephone number is (571) 272-3042. The examiner can normally be reached on Monday-Friday 8:00AM-5:30PM, Alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on (571) 272-3056. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Chieh M Fan
Primary Examiner
Art Unit 2634

December 23, 2004